Work Order ID 72261

Wednesday, July 20, 2011 11:40:45 AM

Item ID: D407-667-205 **Accept** **Setup Start** **Stop**

Revision ID:

Item Name: Crosstube Aft

Start Date: 7/20/2011 **Start Qty:** 1.00 **Cust Item ID:**

Required Date: 8/10/2011 **Req'd Qty:** 1.00 **Customer:**

Reference:

Approvals: **Process Plan:** _____ **Date:** 11-07-20 **Tooling:** _____ **Date:** _____ **Run Start** **Stop**

QC: _____ **Date:** _____ **SPC (Y/N):** _____ **Date:** _____

Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
Draw Nbr	**Revision Nbr**								
D407-667-245	Rev F								
100		0.00							
DC	DOCUMENT CONTROL								
Document Control	**Memo**	0.00							
	Photocopy bluefile and create labels as per PPP D407-667-205 CHG006								
110	Pick Kit	0.00							
Packaging	Packaging								
Packaging	**Memo**	0.00							
120		0.00							
CNC Bend 1	BENDING MACHINE - CROSSTUBES								
CNC Delta 100 Bender	**Memo**	0.00							
	1-Bend tube as per Dwg D407-667-245 using CNC bender program 407 Aft and Folio 21								

11-8-29

11-8-29

Dart Aerospace Ltd

W/O:		WORK ORDER CHANGES					
DATE	**STEP**	**PROCEDURE CHANGE**	**By**	**Date**	**Qty**	**Approval** Chief Eng / Prod Mgr	**Approval** QC Inspector

Part No: _____ **PAR #:** _____ **Fault Category:** _____ **NCR:** Yes No **DQA:** _____ **Date:** _____

Resolution: _____ **Disposition:** _____ **QA: N/C Closed:** _____ **Date:** _____

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	**STEP**	**Description of NC** Section A	**Corrective Action** Section B			**Verification** Section C	**Approval** Chief Eng	**Approval** QC Inspector
			Initial Chief Eng	**Action Description** Chief Eng	**Sign & Date**			

NOTE: Date & initial all entries

Work Order ID 72261

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Run Start **Stop**

Approvals: **Process Plan:** _____ **Date:** _____ **Tooling:** _____ **Date:** _____

QC: _____ **Date:** _____ **SPC (Y/N):** _____ **Date:** _____

Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
130	QC15- Crosstube Dimensional Check	0.00							
QC	**Memo**	0.00							
Quality Control									

Dart Aerospace Ltd

W/O:		WORK ORDER CHANGES					
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Part No: _____ **PAR #:** _____ **Fault Category:** _____ **NCR:** Yes No **DQA:** _____ **Date:** _____

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NOTE: Date & initial all entries

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Reference:

Run Start

Approvals: **Process Plan:** _____ **Date:** _____ **Tooling:** _____ **Date:** _____ **Stop**

QC: _____ **Date:** _____ **SPC (Y/N):** _____ **Date:** _____

Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
140		0.00							
Crosstubes	Crosstubes								
Crosstubes	**Memo**	0.00							

1-Drill pilot holes in tube using drill Jig DT8583 & DT8584 as per Dwg D407-667-245. Drill all (3) top holes.

2-Drill and Ream all holes in tube to finish size using drill Jig DT8583 & DT8584 as per Dwg D407-667-245Check dimensions between holes on all four sides.

3-Flip tube and switch drilling Jigs from right to left, left to right. Locate Jigs off existing holes using "T" pins.

4-Drill pilot holes using drill Jig DT8583 & DT8584 as per Dwg D407-667-245. Drill only the top (2) holes.

5-Drill & ream the top (2) holes to finish size using drill Jig DT8583 & DT8584 as per Dwg D407-667-245

6-Drill Aft rivet holes using drill Jig DT8789 as per Dwg D407-667-245. Note: Aft side has 3x top holes.

7-Drill Fwd rivet holes using drill Jig DT8789 as per Dwg D407-667-245. Drill only the top (3) holes.

8-C'sink holes as per Dwg D407-667-245. Allow rivet to sit below surface to compensate for paint.

9- Scribe tube to identify on the inner chamfer in the cuff D# and B#

10-Deburr & Inspect for surface damage. Repair damage within limits as per

SAD 11-08-26

SAD 11-08-30

Dart Aerospace Ltd

W/O:		WORK ORDER CHANGES					
DATE	**STEP**	**PROCEDURE CHANGE**	**By**	**Date**	**Qty**	**Approval** Chief Eng / Prod Mgr	**Approval** QC Inspector

Part No: _____ **PAR #:** _____ **Fault Category:** _____ **NCR:** Yes No **DQA:** _____ **Date:** _____

Resolution: _____ **Disposition:** _____ **QA: N/C Closed:** _____ **Date:** _____

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NOTE: Date & initial all entries

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Reference:

Run Start

Approvals: **Process Plan:** _____ **Date:** _____ **Tooling:** _____ **Date:** _____

Stop

QC: _____ **Date:** _____ **SPC (Y/N):** _____ **Date:** _____

Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
	Dwg D407-667-245								
150 HandFXtube	Crosstubes Chemical Conversion	0.00	SAD 11-08-30			(1)			
Hand Finishing Crosstubes	**Memo**	0.00							
160 QC	QC3- Inspect Part Finish	0.00	S 11/05/30						
Quality Control	**Memo**	0.00							
170 QC	QC5- Inspect part completeness to step on W/O	0.00	S 11/05/30			(2)			
Quality Control	**Memo**	0.00							

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W/O:		WORK ORDER CHANGES					
DATE	**STEP**	**PROCEDURE CHANGE**	**By**	**Date**	**Qty**	**Approval** Chief Eng / Prod Mgr	**Approval** QC Inspector

Part No: _____ **PAR #:** _____ **Fault Category:** _____ **NCR:** Yes No **DQA:** _____ **Date:** _____

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NOTE: Date & initial all entries

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QC: _____ **Date:** _____ **SPC (Y/N):** _____ **Date:** _____

Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
180	Outsource process - NDT per QSI038 4.1	0.00				CL		11/09/06	(1)
Outsource2	**Memo**	0.00							
Outsource process - NDT	Liquid Penetrant Inspection as per QSI 038O Issue P/O: 14831 LPI as per ASTM 1417 Level 2 Attach copy of NDT results to work order								
190		0.00							
Packaging	Packaging								
Packaging	**Memo**	0.00							
	Ensure copy of NDT results attached to work order.								
200	QC5- Inspect part completeness to step on W/O	0.00							
QC	**Memo**	0.00							
Quality Control									

Dart Aerospace Ltd

W/O:		WORK ORDER CHANGES					
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Part No: _____ **PAR #:** _____ **Fault Category:** _____ **NCR:** Yes No **DQA:** _____ **Date:** _____

Resolution: _____ **Disposition:** _____ **QA: N/C Closed:** _____ **Date:** _____

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Revision ID: **Stop**

Item Name: Crosstube Aft

Start Date: 7/20/2011 **Start Qty:** 1.00 **Cust Item ID:**

Required Date: 8/10/2011 **Req'd Qty:** 1.00 **Customer:**

Reference:

Approvals: **Process Plan:** _____ **Date:** _____ **Tooling:** _____ **Date:** _____ **Run Start**

QC: _____ **Date:** _____ **SPC (Y/N):** _____ **Date:** _____ **Stop**

Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
210		0.00							
SprayPaint	SprayPaint								
	Memo	0.00							
Spray Painting	1-Prime inside and outside crosstube as per DEO D407-667-245 and QSI 005 4.2 2-Paint outside crosstube with White Imron as per QSI 005 4.2 PRIME: Start Time: 7:30 Fininsh Time: 9:00 PAINT: Start Time: 1:00 Finish Time: 2:30					11	09	07 (1)	
220	QC14- Inspect Spray Paint	0.00							
QC	**Memo**	0.00							
Quality Control	Then, Wrap in plastic bag to protect from scratches								

BT 11-09-14 PM →

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W/O: 72261		WORK ORDER CHANGES					
DATE	**STEP**	**PROCEDURE CHANGE**	**By**	**Date**	**Qty**	**Approval** Chief Eng / Prod Mgr	**Approval** QC Inspector

Part No: D403-667-205 **PAR #:** N/A **Fault Category:** Landing Gear x-tube **NCR:** (Yes) No **DQA:** [signature] **Date:** 11.10.07

11-869 **Resolution:** re work **Disposition:** re work **QA: N/C Closed:** CK **Date:** 11/10/11

NCR:		WORK ORDER NON-CONFORMANCE (NCR)							
DATE	**STEP**	**Description of NC** Section A	**Corrective Action** Section B			**Verification** Section C	**Approval** Chief Eng	**Approval** QC Inspector	
			Initial Chief Eng	**Action Description** Chief Eng	**Sign & Date**				
11/09/08	# 210	employee forgot to leave inspection strip on tube. R.C. 108 (Drawing clear)	[signature] 11.09.08 QSTEAM	- Apply Stripper to entire tube (outside) - Apply Clear Coat on Primer As per Dwg + QSZ005	11.09.08 (1) 11.09.12	ET 11-09-14	[signature] 11.09.08 QSTEAM	S 11/09/08	
			[signature]	- Re Paint As Per Dwg AND QSZ005	11.09.13 (1)	ET 11-07-14	[signature]	S 11/09/08	

NOTE: Date & initial all entries

Work Order ID 72261

Wednesday, July 20, 2011 11:40:45 AM

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Revision ID: **Stop**

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Required Date: 8/10/2011 **Req'd Qty:** 1.00 **Customer:**

Reference:

Approvals: **Process Plan:** _____ **Date:** _____ **Tooling:** _____ **Date:** _____ **Run Start**

QC: _____ **Date:** _____ **SPC (Y/N):** _____ **Date:** _____ **Stop**

Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
230		0.00							
Crosstubes	Crosstubes								
Crosstubes	**Memo**	0.00							
Crosstubes	1- Install chafing shield as per DEO D407-667-245.Note: (3) top holes should be facing up.								
	2- Lightly scuff the bonded area using a 320 grit sand paper and clean the area with 41058 wash 'n' wipe								
	3-Install support ~~with magnebond~~ and install clamps as per Dwg D407-667-245 using installaition jig DT9025. Torque clamps to 80-100 in lb A/R ~~Magnebond~~ Batch: 118234 EXP: 11/11								
	4-Install nut plates as per Dwg D407-667-245. Touch-up rivet heads with Imron paint.								
240	QC5- Inspect part completeness to step on W/O	0.00							
QC	**Memo**	0.00							
Quality Control									

Pro Seal

8 11/9/21

Dart Aerospace Ltd

W/O:		WORK ORDER CHANGES					
DATE	**STEP**	**PROCEDURE CHANGE**	**By**	**Date**	**Qty**	**Approval** Chief Eng / Prod Mgr	**Approval** QC Inspector

Part No: _____ **PAR #:** _____ **Fault Category:** _____ **NCR:** Yes No **DQA:** _____ **Date:** _____

Resolution: _____ **Disposition:** _____ **QA: N/C Closed:** _____ **Date:** _____

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NOTE: Date & initial all entries

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Run Start

Approvals: **Process Plan:** _____ **Date:** _____ **Tooling:** _____ **Date:** _____

QC: _____ **Date:** _____ **SPC (Y/N):** _____ **Date:** _____ **Stop**

Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
250	Pick Kit	0.00				11/9/12			
Packaging	Memo	0.00							
Packaging									
260	QC4- 100% Inspect kits for completeness	0.00							
QC	Memo	0.00 8/4/09/12							
Quality Control									
270		0.00							
Packaging	Packaging								
Packaging	Memo	0.00							
Packaging	Identify and in kanban rack Location: 63 Rack								

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W/O:		WORK ORDER CHANGES					
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Part No: _____ **PAR #:** _____ **Fault Category:** _____ **NCR:** Yes No **DQA:** _____ **Date:** _____

Resolution: _____ **Disposition:** _____ **QA: N/C Closed:** _____ **Date:** _____

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Run Start

Approvals: **Process Plan:** _____ **Date:** _____ **Tooling:** _____ **Date:** _____

Stop

QC: _____ **Date:** _____ **SPC (Y/N):** _____ **Date:** _____

Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
280	QC21- Final Inspection - Work Order Release	0.00							11/9/22
QC	**Memo**	0.00							
Quality Control									

MF 11-09-22

Dart Aerospace Ltd

W/O:		WORK ORDER CHANGES					
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NOTE: Date & initial all entries

Picklist Print

Wednesday, July 20, 2011 11:40:52 AM

Work Order ID: 72261

Parent Item: D407-667-205

Parent Item Name: Crosstube Aft

Start Date: 7/20/2011 **Required Date:** 8/10/2011

Start Qty: 1.00 **Required Qty:** 1.00

Comments: IPP Rev:C□05.09.02□Add holes for compatibility with Bell Skidtubes□KJ/JLM
IPP Rev:D Added Magnobond,Rubber Cushion & Clamps 07-02-19 JLM

****CHANGE TO CHG 005 - IF USING D2894-1 B35578 OR GREATER****
IPP Rev:E 08-05-22 add comment in seq. 6 and QC15 and QC5 DD verified by:EC
IPP Rev:F 08-06-12 add comment in seq. 24 DD verified by:EC
IPP Rev:G 08-08-19 revE as per dwg DD verified by:EC
IPP Rev H 09.01.06 ECN 08-562 EC verified by:DD IPP Rev:I 10.04.07 revise route seq. in bom DD verified by:JLM IPP Rev J 11.04.26 removed abrasion strip ecn 11-551 EC verified by:DD

Component Item ID/ Item Name	Replacement Item ID	Mfg/ Purch	Bin Item	Primary Location	Last Location	Route Seq ID	Unit of Measure	Qty on Hand	Qty per Kit	Total Qty	Qty Issued	Date Issued	Status
D407-667-205TRN		Manufactured	No			110	Each	2.0000	1	1			
Crosstube Turning Detail													
				Location		**Loc Qty**			**Loc Code**				
				LG003	B72492	2							
					71817	1							
					71819	1							
AN960JD516	NAS1149D0563J	Purchased	No			230	Each	0.0000	18	18			
Washer													
D2873-043		Manufactured	No			230	Each	16.0000	2	2			
Nut Plate Assembly													
				Location		**Loc Qty**			**Loc Code**				
				LG052		16							
					71306	16							

11-8-29

M118206 11/4/21

72644 11-09-21

Dart Aerospace Ltd

W/O:		WORK ORDER CHANGES					
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Parent Item: D407-667-205

Parent Item Name: Crosstube Aft

Start Date: 7/20/2011 **Required Date:** 8/10/2011

Start Qty: 1.00 **Required Qty:** 1.00

D2873-045	Manufactured	No		230	Each	11.0000	2	2 72564 72562 11 09 20

Nut Plate Assembly

Location	Loc Qty	Loc Code
LG052	11	
71307	11	

D2894-1	Manufactured	No		230	Each	6.0000	1	1 11·09·20

2.750 Support

B# 68632

Location	Loc Qty	Loc Code
LG	2	
66702	2	
LG052	4	
43881	4	

D3190-1	Manufactured	No		230	Each	10.0000	2	2 11·09·20

Chafing Shield

B# 72249

Location	Loc Qty	Loc Code
LG	10	
68372	10	

D3595-063-450	Manufactured	No		230	Each	100.5600	2	2 11·09·20

RUBBER CUSHION

Location	Loc Qty	Loc Code
LG	100.56	
67353	3	
68893	6	
70113	11.56	
71354	80	

Dart Aerospace Ltd

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NOTE: Date & initial all entries

Work Order ID: 72261

Parent Item: D407-667-205

Parent Item Name: Crosstube Aft

Start Date: 7/20/2011 **Required Date:** 8/10/2011

Start Qty: 1.00 **Required Qty:** 1.00

MS20601-AD4W8	Purchased	No		230	Each	183.0000	14	14

RIVET

M11872 11.09.21

Location	Loc Qty	Loc Code
LG	100	
108521	100	
LG051	83	
117106	7	
117381	3	
117979	73	

MS21920-22	Purchased	No		230	Each	97.0000	4	4

Clamp(per MIL-DTL-8783C)

11.09.20

Location	Loc Qty	Loc Code
LG050	97	
116207	7	
117506	40	
118186	50	

MS21920-25	Purchased	No		230	Each	124.0000	2	2

Clamp(per MIL-DTL-8783C)

11.09.20

Location	Loc Qty	Loc Code
LG	100	
113281	0	
113282	0	
118142	50	
118183	50	
LG050	24	
116264	2	
117998	22	

Dart Aerospace Ltd

W/O:		WORK ORDER CHANGES					
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NOTE: Date & initial all entries

Picklist Print

Wednesday, July 20, 2011 11:40:53 AM

Work Order ID: 72261

Parent Item: D407-667-205

Parent Item Name: Crosstube Aft

Start Date: 7/20/2011 **Required Date:** 8/10/2011

Start Qty: 1.00 **Required Qty:** 1.00

AN5-10A	Purchased	No		250	Each	272.0000	10	10

Bolt

Location	Loc Qty	Loc Code
ST337	272	
116704	16	
117795	125	
117872	72	
118191	59	

AN5-32A	Purchased	No		250	Each	178.0000	4	4

Bolt

Location	Loc Qty	Loc Code
ST340	178	
117161	2	
117514	50	
117688	16	
117872	60	
118191	50	

AN5-34A	Purchased	No		250	Each	82.0000	4	4

Bolt

Location	Loc Qty	Loc Code
ST340	82	
117366	12	
117794	70	

Dart Aerospace Ltd

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DATE	**STEP**	**PROCEDURE CHANGE**	**By**	**Date**	**Qty**	**Approval** Chief Eng / Prod Mgr	**Approval** QC Inspector

Part No: _____ **PAR #:** _____ **Fault Category:** _____ **NCR:** Yes No **DQA:** _____ **Date:** _____

Resolution: _____ **Disposition:** _____ **QA: N/C Closed:** _____ **Date:** _____

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	**STEP**	**Description of NC** Section A	**Corrective Action** Section B			**Verification** Section C	**Approval** Chief Eng	**Approval** QC Inspector
			Initial Chief Eng	**Action Description** Chief Eng	**Sign & Date**			

NOTE: Date & initial all entries

Picklist Print

Wednesday, July 20, 2011 11:40:53 AM

Work Order ID: 72261

Parent Item: D407-667-205

Parent Item Name: Crosstube Aft

Start Date: 7/20/2011 **Required Date:** 8/10/2011

Start Qty: 1.00 **Required Qty:** 1.00

MS21042L5	Purchased	No		250	Each	1,324.000	4	4

Nut

4/9/24

Location	Loc Qty	Loc Code	
ST300	1324		
116105	5		
116548	135		
117441	498		4
117591	100		
117611	90		
118179	496		

Dart Aerospace Ltd

W/O:		WORK ORDER CHANGES					
DATE	**STEP**	**PROCEDURE CHANGE**	**By**	**Date**	**Qty**	**Approval** Chief Eng / Prod Mgr	**Approval** QC Inspector

Part No: _____ **PAR #:** _____ **Fault Category:** _____ **NCR:** Yes No **DQA:** _____ **Date:** _____

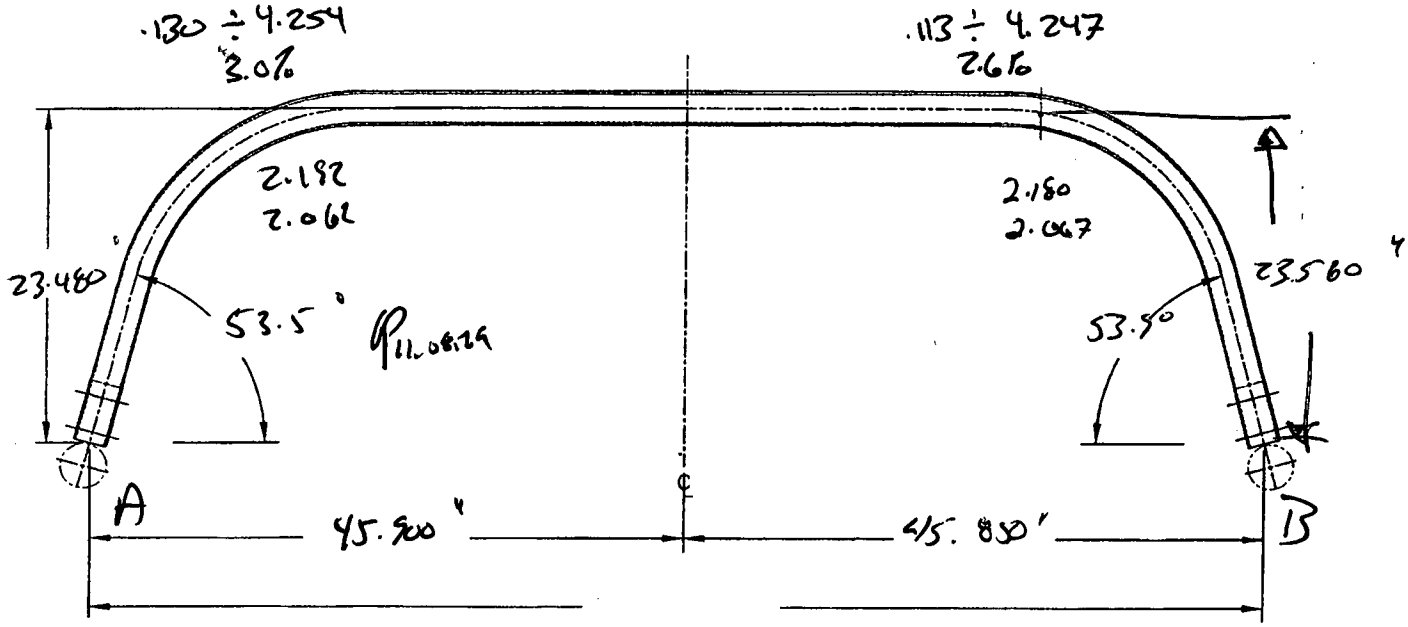
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DATE	**STEP**	**Description of NC** Section A	**Corrective Action** Section B			**Verification** Section C	**Approval** Chief Eng	**Approval** QC Inspector
			Initial Chief Eng	**Action Description** Chief Eng	**Sign & Date**			

NOTE: Date & initial all entries

DART AEROSPACE LTD	Work Order:	42261
Description: Crosstube High Aft (407)	Part Number:	D407-667-205
Inspection Dwg: D407-667-245 **Rev:** F		Page 1 of 1

Required Dimension	Min	Max
Height 23.52	~~23.46~~ ~~23.39~~	~~23.58~~ 23.65"
1/2 Span 45.92	~~45.86~~ ~~45.79~~	~~45.98~~ 46.05"
Angle	54	56
Total Span 91.84	~~91.72~~ 91.58"	~~91.96~~ 92.100"



Comments
Side A = 3.0% crushing @ 30 passes
Side B = 2.6% crushing @ 30 passes
Angles too low, Acceptable 11.08.25

QC15 Inspection	5 Nov 08/25
Date	

Rev	Date	Change	Revised by	Approved
A	07.02.06	New Issue	KJ/JM	
B	09.06.22	Dwg Rev updated	KJ	

Dart Aerospace Ltd

W/O:		WORK ORDER CHANGES					
DATE	**STEP**	**PROCEDURE CHANGE**	**By**	**Date**	**Qty**	**Approval** Chief Eng / Prod Mgr	**Approval** QC Inspector

Part No: _____ **PAR #:** _____ **Fault Category:** _____ **NCR:** Yes No **DQA:** _____ **Date:** _____

Resolution: _____ **Disposition:** _____ **QA: N/C Closed:** _____ **Date:** _____

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			Initial Chief Eng	**Action Description** Chief Eng	**Sign & Date**			

NOTE: Date & initial all entries

Item	QTY -245	PART NUMBER	DESCRIPTION
1	X	D407-667-245	CROSSTUBE ASSEMBLY (407 HIGH AFT)
2	1	D6011-115	CROSSTUBE
3	2	D2856-400-773	ABRASION STRIP
4	2	D2873-043	NUT PLATE
5	2	D2873-045	NUT PLATE
6	1	D2894-1	SUPPORT
7	2	D3190-1	CHAFING SHIELD
8	2	D3595-063-430	RUBBER CUSHION
9	14	MS20601AD4W8	RIVET (OR NAS9302B-4-8)
10	4	MS21920-22	CLAMP
11	2	MS21920-25	CLAMP (OR MS21920-24)
12	A/R	MAGNOBOND 6398	ROCKWELL SPECIFICATION RBO-120-023 ADHESIVE (TEXTRON/BELL SPEC. 299-947-100, TYPE II, CLASS 2 ADHESIVE)

GENERAL NOTES:

1) MATERIAL: MANUFACTURED FROM D6011-115
 FINISHED LENGTH = 112.91±0.020
2) FINISH: CHEMICAL CONVERSION COAT PER DART QSI 005 4.1
 PRIME INSIDE AND OUTSIDE PER DART QSI 005 4.2
 PAINT OUTSIDE PER DART QSI 005 4.2
3) TOLERANCES ARE PER DART QSI 018 UNLESS OTHERWISE NOTED.
4) UNITS: INCHES UNLESS OTHERWISE NOTED.
5) BREAK SHARP EDGES: 0.005 TO 0.010 MAX.
6) IDENTIFICATION: SCRIBE DART PART NUMBER "D407-667-245" AND BATCH NUMBER ON INSIDE OF CUFF USING VIBRATING STYLUS.
7) WEIGHT: 27.7 lbs
8) PART IS SYMMETRIC ABOUT CENTERLINE.
9) RUN-OFF PART. BLEND OUT EDGE LONGITUDINALLY, TRANSITION SHOULD BE SMOOTH.
10) BEND PROGRESSIVELY WITH A MINIMUM OF 6 PASSES. MAXIMUM TUBE FLATTENING DUE TO BENDING IS 6% BASED ON O.D.
11) LIQUID PENETRANT INSPECT OUTSIDE SURFACE OF CROSSTUBE PER QSI 038.
12) INSTALL D2894-1 CENTER SUPPORT USING A 0.03" TO 0.06" THICK LAYER OF MAGNOBOND 6398 PER QSI 015. LET CURE FOR 12 HOURS AFTER INSTALLATION AND PRIOR TO PACKAGING.
13) INSTALL MS21920-25 CLAMPS WITH D3595-063-430 RUBBER CUSHIONS TO SECURE D2894-1 SUPPORT ON TOP SIDE OF THE CROSSTUBE. ENSURE CLAMPS ARE OPPOSITE CROSSTUBE SUPPORT.
 NOTE: MS21920-24 CLAMPS CAN BE USED TO ACCOMMODATE VARYING DIAMETERS. ENSURE THERE IS A MINIMUM OF 1.5 THREADS IN SAFETY ON THE NUTS.
14) EXTREME CARE MUST BE TAKEN TO PROTECT THE OUTSIDE SURFACE OF THE TUBE. THE OUTSIDE SURFACE MUST BE SMOOTH AND FREE FROM SURFACE DEFECTS SUCH AS SCRATCHES, NICKS, OR DENTS. DEFECTS UP TO 0.005" MAY BE BLENDED OUT LONGITUDINALLY. CIRCUMFERENTIAL GRIND MARKS ARE UNACCEPTABLE.
15) INSTALL D2856-400-773 ABRASION STRIP WITH A 0.13 (REF) GAP ON BOTTOM SIDE OF CROSSTUBE, PER QSI 035.
16) INSTALL D3190-1 CHAFING SHIELDS SO THAT OVERLAP IS ON BOTTOM SIDE OF CROSSTUBE OPPOSITE D2894-1 SUPPORT.
17) TORQUE CLAMPS 80 TO 100 IN-LB. ENSURE AT LEAST 1.5 THREADS ARE SHOWING IN SAFETY AND THAT NUT HAS NOT BOTTOMED-OUT AFTER TORQUING.

SHOP COPY
RETURN TO
ENGINEERING
UNCONTROLLED COPY
SUBJECT TO AMENDMENT
WITHOUT NOTICE
WORK ORDER
NO. 72261
PR 11-07-20

DEO ATTACHED

RELEASED
08/11/12

REV.	DESCRIPTION	BY	DATE
F	REFORMAT NOTES TO NEW STANDARDS (ZN B8-1); RELOCATED FLAG # 6 (ZN A8-3) PER NCR 210; REMOVED REF. & ADD TOLERANCES (ZN C6-3, C4-3 & D2-3)	RF	08.11.06
E	8.02 AND 8.53 WERE 8.40 AND 8.90 (ZN D5-2); REORGANIZED VIEWS AND REFORMATED DRAWING TO CURRENT STANDARDS. REASONS: CLAMPS MOVED 0.375 TOWARD CL TO ELIMINATE INTERFERENCE WITH AIRCRAFT MOUNTS. REFERENCE: PAR#08-21 AND ECN#1225	MB	08.07.24
D	ADD VIEW FOR OEM SKID HOLES, ROTATE ORIENTATION OF CLAMPS SECTION F-F, REMOVE -851 ABRASION STRIP, ADD MAGNOBOND 6398, ADD CUSHION	PH	07.02.07
C	ADD HOLES AND NUT PLATES FOR COMPATIBILITY WITH BHT/AA SKIDTUBES	PH	05.07.26
B	ADD CHAFING SHIELD	CP	03.05.21
A	NEW ISSUE	CP	02.05.13

DESIGN	RF	**DART AEROSPACE LTD** HAWKESBURY, ONTARIO, CANADA
DRAWN	RF	
CHECKED		DRAWING NO. D407-667-245 — REV. F — SHEET 1 OF 4
MFG. APPR.		
APPROVED		TITLE: CROSSTUBE ASS'Y (407 HIGH AFT) — SCALE: NTS
DE APPR.		
DATE	08.11.06	

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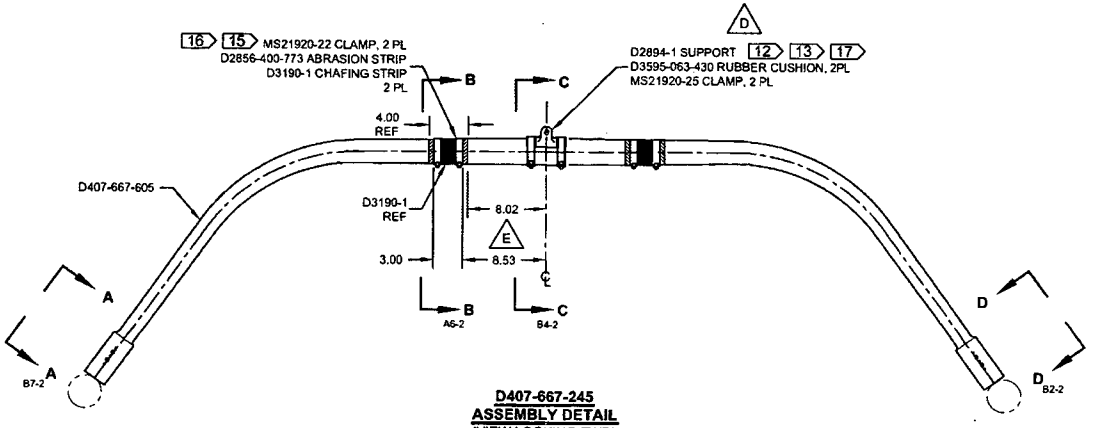
W/O:		WORK ORDER CHANGES					
DATE	**STEP**	**PROCEDURE CHANGE**	**By**	**Date**	**Qty**	**Approval** Chief Eng / Prod Mgr	**Approval** QC Inspector

Part No: _____ **PAR #:** _____ **Fault Category:** _____ **NCR:** Yes No **DQA:** _____ **Date:** _____

Resolution: _____ **Disposition:** _____ **QA: N/C Closed:** _____ **Date:** _____

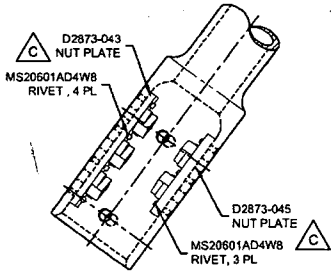
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DATE	**STEP**	**Description of NC** Section A	**Corrective Action** Section B			**Verification** Section C	**Approval** Chief Eng	**Approval** QC Inspector
			Initial Chief Eng	**Action Description** Chief Eng	**Sign & Date**			

NOTE: Date & initial all entries

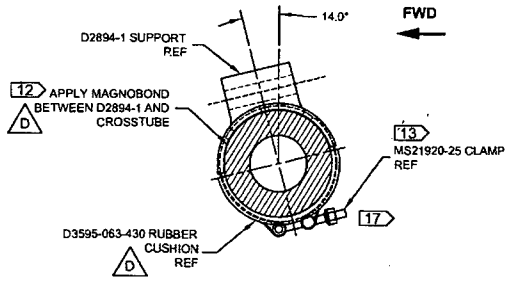


72261

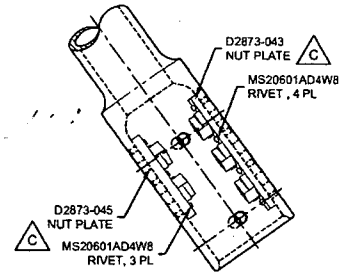
D407-667-245
ASSEMBLY DETAIL
(VIEW LOOKING FWD)



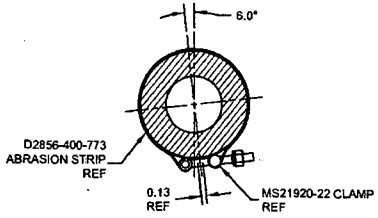
C7-2 **VIEW A-A CUFF DETAIL**
SCALE 4X



C4-2 **SECTION C-C**
SCALE 4X



C2-2 **VIEW D-D CUFF DETAIL**
SCALE 4X



C5-2 **SECTION B-B**
SCALE 4X, 2PL

DEO ATTACHED

RELEASED 08/11/12

DESIGN		**DART AEROSPACE LTD**	
DRAWN	RF	HAWKESBURY, ONTARIO, CANADA	
CHECKED		DRAWING NO.	REV. F
MFG. APPR.		D407-667-245	SHEET 2 OF 4
APPROVED		TITLE	SCALE
DE APPR.		CROSSTUBE ASS'Y (407 HIGH AFT)	NTS
DATE	08.11.06		

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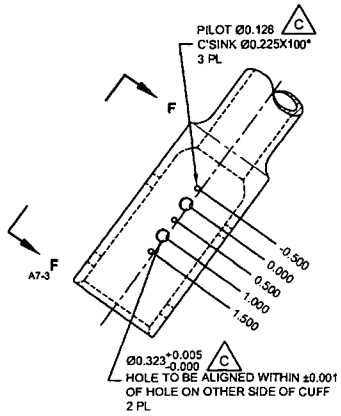
W/O:		WORK ORDER CHANGES					
DATE	**STEP**	**PROCEDURE CHANGE**	**By**	**Date**	**Qty**	**Approval** Chief Eng / Prod Mgr	**Approval** QC Inspector

Part No: _____ **PAR #:** _____ **Fault Category:** _____ **NCR:** Yes No **DQA:** _____ **Date:** _____

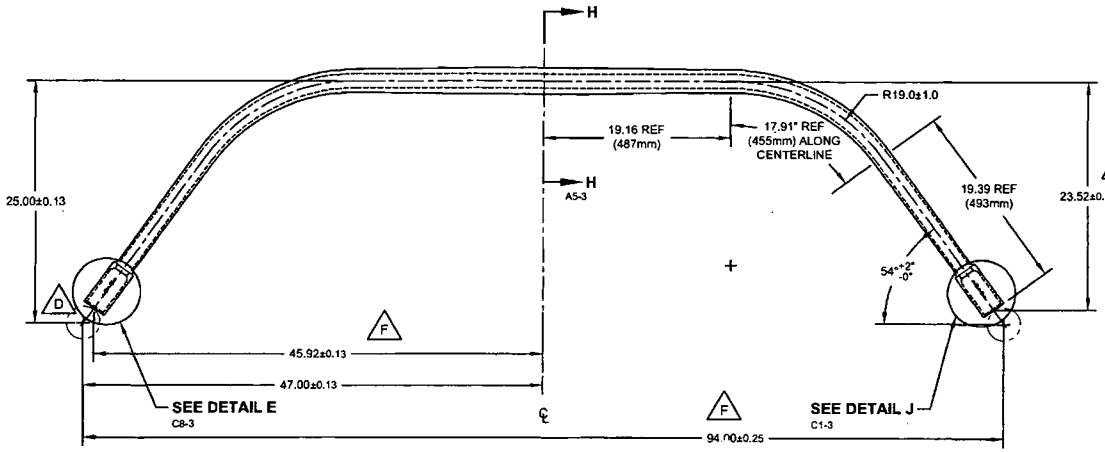
Resolution: _____ **Disposition:** _____ **QA: N/C Closed:** _____ **Date:** _____

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			Initial Chief Eng	**Action Description** Chief Eng	**Sign & Date**			

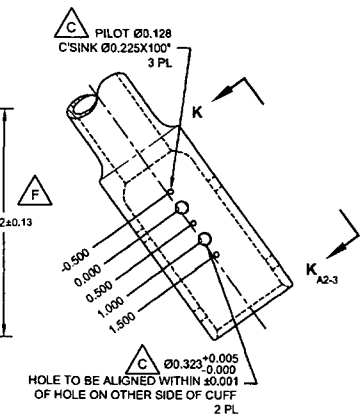
NOTE: Date & initial all entries



C6-3 **DETAIL E**
SCALE 4X
(VIEW LOOKING FWD)

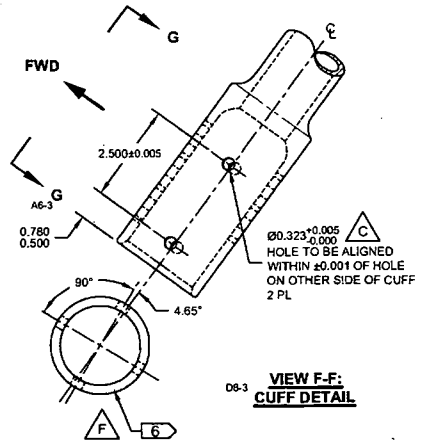


10 **D407-667-605**
BENDING AND DRILLING DETAIL
(VIEW LOOKING FWD)

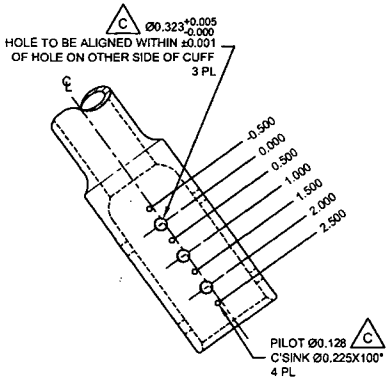


C3-3 **DETAIL J**
SCALE 4X
(VIEW LOOKING FWD)

DEO ATTACHED RELEASED 08/11/12

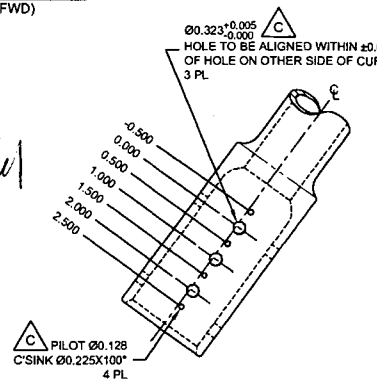


D8-3 **VIEW F-F:**
CUFF DETAIL

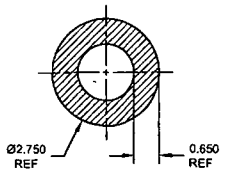


B8-3 **VIEW G-G**
(VIEW LOOKING AFT, ROTATED)

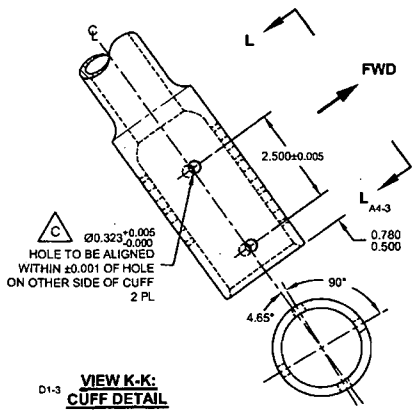
7226



B1-3 **VIEW L-L**
(VIEW LOOKING AFT, ROTATED)



D4-3 **SECTION H-H**
SCALE 4X



D1-3 **VIEW K-K:**
CUFF DETAIL

DESIGN	QP	**DART AEROSPACE LTD** HAWKESBURY, ONTARIO, CANADA
DRAWN	RF	
CHECKED		DRAWING NO. D407-667-245 REV. F SHEET 3 OF 4
MFG. APPR.		
APPROVED		TITLE CROSSTUBE ASS'Y (407 HIGH AFT) SCALE NTS
DE APPR.		
DATE	08.11.06	

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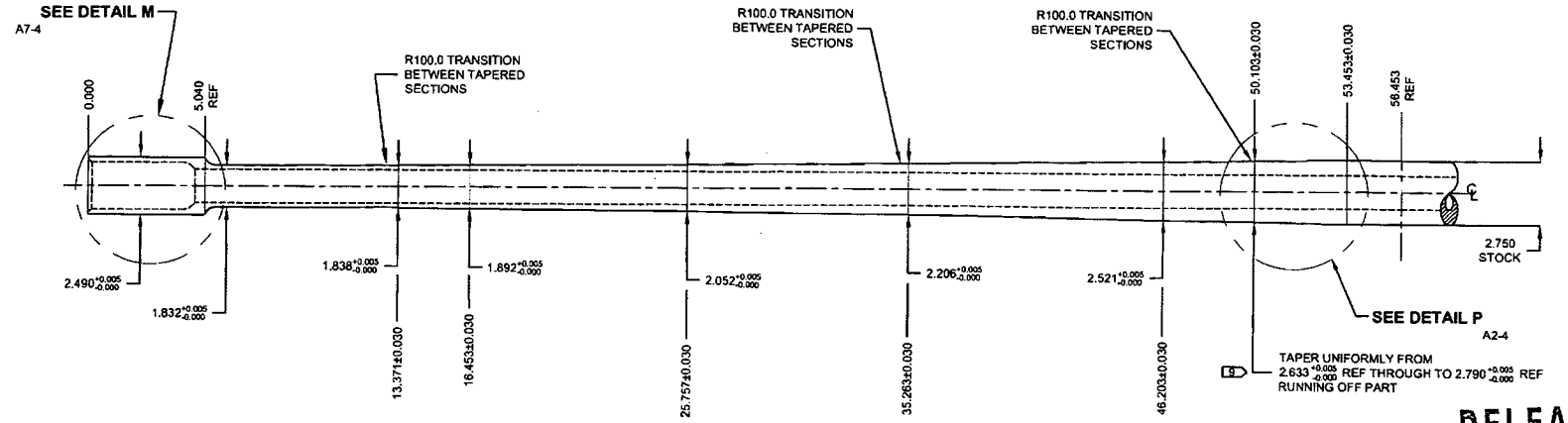
W/O:		WORK ORDER CHANGES					
DATE	**STEP**	**PROCEDURE CHANGE**	**By**	**Date**	**Qty**	**Approval** Chief Eng / Prod Mgr	**Approval** QC Inspector

Part No: _____ **PAR #:** _____ **Fault Category:** _____ **NCR:** Yes No **DQA:** _____ **Date:** _____

Resolution: _____ **Disposition:** _____ **QA: N/C Closed:** _____ **Date:** _____

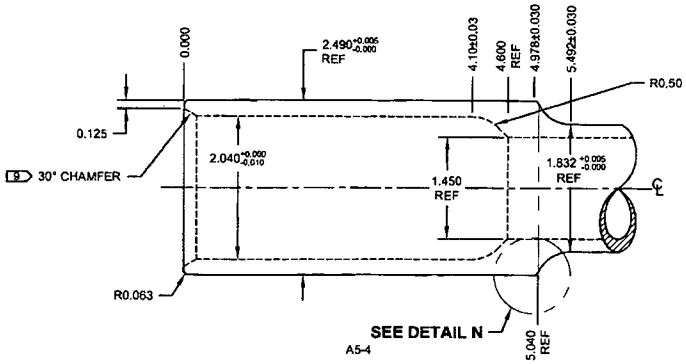
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			Initial Chief Eng	**Action Description** Chief Eng	**Sign & Date**			

NOTE: Date & initial all entries

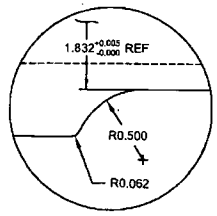


D407-667-245 MACHINING DETAIL

RELEASED 08/11/12 MD

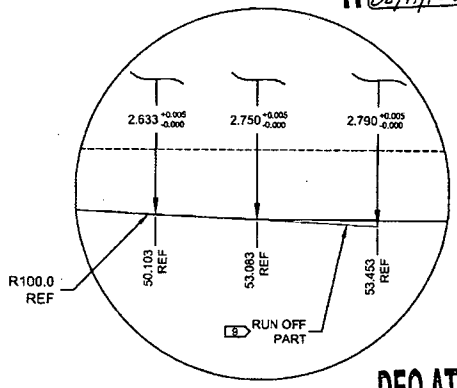


D8-4 **DETAIL M: CROSSTUBE CUFF**
SCALE 3X



B6-4 **DETAIL N: CUFF TRANSITION**
SCALE 2X

12261



DEO ATTACHED

C1-4 **DETAIL P: TAPER RUN-OFF**
NOT TO SCALE

DESIGN		**DART AEROSPACE LTD** HAWKESBURY, ONTARIO, CANADA	
DRAWN	RF		
CHECKED		DRAWING NO.	REV. F
MFG. APPR.		D407-667-245	SHEET 4 OF 4
APPROVED		TITLE	SCALE
DE APPR.		CROSSTUBE ASS'Y (407 HIGH AFT)	NTS
DATE	08.11.06		

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W/O:		WORK ORDER CHANGES					
DATE	**STEP**	**PROCEDURE CHANGE**	**By**	**Date**	**Qty**	**Approval** Chief Eng / Prod Mgr	**Approval** QC Inspector

Part No: _____ **PAR #:** _____ **Fault Category:** _____ **NCR:** Yes No **DQA:** _____ **Date:** _____

Resolution: _____ **Disposition:** _____ **QA: N/C Closed:** _____ **Date:** _____

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	**STEP**	**Description of NC** Section A	**Corrective Action** Section B			**Verification** Section C	**Approval** Chief Eng	**Approval** QC Inspector
			Initial Chief Eng	**Action Description** Chief Eng	**Sign & Date**			

NOTE: Date & initial all entries

DRAWING NO.	TITLE	REV. F	DART AEROSPACE LTD ENGINEERING ORDER	D.E.O. NO.	SHEET NO.	SCALE
D407-667-245	CROSSTUBE ASSY (407 HIGH AFT)			D407-667-245-F-1	SHEET 1 OF 2	NTS

DRAWN	CHECKED	MFG. APPR.	APPROVED	DE APPR.
DATE 11.04.08	DATE 11.04.12	DATE 11.04.12	DATE 11.04.12	DATE 11-04-12

PURPOSE:
REMOVED ABRASION STRIP IN FAVOR OF A THIN LAYER OF PROSEAL 890.

RELEASED
2011 -04- 18

CHANGE:

PARTS LIST IS AMENDED AS FOLLOWS:

IS:

Item	Qty -245	Part Number	Description
3	0	D2856-400-773	ABRASION STRIP

WAS:

3	2	D2856-400-773	ABRASION STRIP

7226L

NOTES 2 AND 15, SHEET 1 ARE AMENDED AS FOLLOWS:

IS:

2) FINISH: CHEMICAL CONVERSION COAT PER DART QSI 005 4.1
PRIME INSIDE AND OUTSIDE PER DART QSI 005 4.2
MASK UNDERSIDE OF CROSSTUBE AS SHOWN (HATCHED AREA) AND
PAINT OUTSIDE PER DART QSI 005 4.2
REMOVE MASKING AND APPLY CLEAR COAT

15) APPLY A THIN COAT OF PROSEAL 890 ON INSIDE CONCAVE SURFACE OF D3190-1 CHAFING SHIELDS AND LET CURE PER MANUFACTURER'S INSTRUCTIONS. INSTALL PROSEALED D3190-1 CHAFING SHIELDS ONTO CROSSTUBE BY APPLYING A THIN COAT OF PROSEAL 890 ONTO CROSSTUBE. BE SURE TO ELIMINATE ANY AIR GAPS.

WAS:

2) FINISH: CHEMICAL CONVERSION COAT PER DART QSI 005 4.1
PRIME INSIDE AND OUTSIDE PER DART QSI 005 4.2
PAINT OUTSIDE PER DART QSI 005 4.2

15) INSTALL D2856-400-773 ABRASION STRIP WITH A 0.13 REF GAP ON BOTTOM SIDE OF CROSSTUBE PER QSI 035.

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W/O:		WORK ORDER CHANGES					
DATE	**STEP**	**PROCEDURE CHANGE**	**By**	**Date**	**Qty**	**Approval** Chief Eng / Prod Mgr	**Approval** QC Inspector

Part No: _____ **PAR #:** _____ **Fault Category:** _____ **NCR:** Yes No **DQA:** _____ **Date:** _____

Resolution: _____ **Disposition:** _____ **QA: N/C Closed:** _____ **Date:** _____

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			Initial Chief Eng	**Action Description** Chief Eng	**Sign & Date**			

NOTE: Date & initial all entries

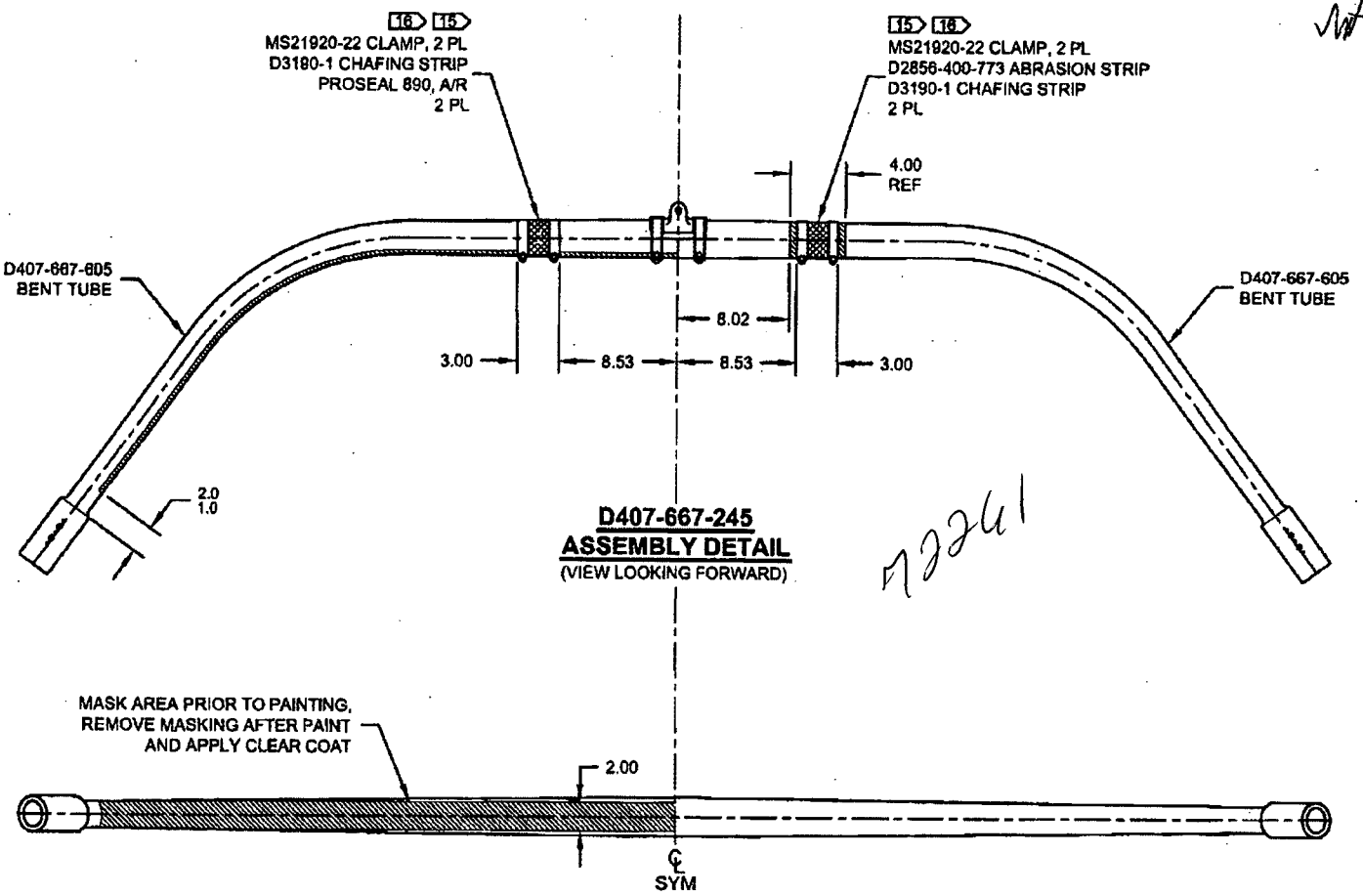
DRAWING NO.	TITLE	REV. F	DART AEROSPACE LTD ENGINEERING ORDER	D.E.O. NO.	SHEET NO.	SCALE
D407-667-245	CROSSTUBE ASSY (407 HIGH AFT)			D407-667-245-F-1	SHEET 2 OF 2	NTS

DRAWN	CHECKED	MFG. APPR.	APPROVED	DE APPR.
DATE 11.04.08	DATE 11.04.11	DATE 11.04.12	DATE 11/04/12	DATE 11-04-12

RELEASED
2011 -04- 18

IS:

WAS:



D407-667-245
ASSEMBLY DETAIL
(VIEW LOOKING FORWARD)

77241

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Dart Aerospace Ltd

W/O:		WORK ORDER CHANGES					
DATE	**STEP**	**PROCEDURE CHANGE**	**By**	**Date**	**Qty**	**Approval** Chief Eng / Prod Mgr	**Approval** QC Inspector

Part No: _____ **PAR #:** _____ **Fault Category:** _____ **NCR:** Yes No **DQA:** _____ **Date:** _____

Resolution: _____ **Disposition:** _____ **QA: N/C Closed:** _____ **Date:** _____

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	**STEP**	**Description of NC** Section A	**Corrective Action** Section B			**Verification** Section C	**Approval** Chief Eng	**Approval** QC Inspector
			Initial Chief Eng	**Action Description** Chief Eng	**Sign & Date**			

NOTE: Date & initial all entries

5.0 PARTS LIST

REFERENCE ONLY

5.1 HIGH GEAR CROSSTUBES

Item	Qty -101	Qty -201	Qty -103	Qty -203	Qty -105	Qty -205	Part Number	Description
	X						**D206-667-101**	**CROSSTUBE INSTALLATION, 206A/B HIGH FWD**
		X					**D206-667-201**	**CROSSTUBE INSTALLATION, 206A/B HIGH AFT**
			X				**D206-667-103**	**CROSSTUBE INSTALLATION, 206L/L-1/L-3/L-4 HIGH FWD**
				X			**D206-667-203**	**CROSSTUBE INSTALLATION, 206L/L-1/L-3/L-4 HIGH AFT**
					X		**D407-667-105**	**CROSSTUBE INSTALLATION, 407 HIGH FWD**
						X	**D407-667-205**	**CROSSTUBE INSTALLATION, 407 HIGH AFT**
1	1						D206-667-141	CROSSTUBE ASSEMBLY, 206A/B HIGH FWD
2		1					D206-667-241	CROSSTUBE ASSEMBLY, 206A/B HIGH AFT
3			1				D206-667-143	CROSSTUBE ASSEMBLY, 206L/L-1/L-3/L-4 HIGH FWD
4				1			D206-667-243	CROSSTUBE ASSEMBLY, 206L/L-1/L-3/L-4 HIGH AFT
5					1		D407-667-145	CROSSTUBE ASSEMBLY, 407 HIGH FWD
6						1	D407-667-245	CROSSTUBE ASSEMBLY, 407 HIGH AFT
10	*2	*2	*2		*2		D2891-1	SUPPORT
11				*2			D2892-1	SUPPORT
12						*1	D2894-1	SUPPORT
13	*4	*4	*4		*4		D3595-063-395	RUBBER CUSHION
14				*4			D3595-063-450	RUBBER CUSHION
15						*2	D3595-075-430	RUBBER CUSHION
16	*4	*4	*4		*4		MS21920-20	CLAMP
17				*4		*4	MS21920-22	CLAMP
18						*2	MS21920-25	CLAMP (OR MS21920-24)
19	4	4	4		4		AN5-32A	BOLT
20				4		4	AN5-34A	BOLT
21	4	4	4	4	4	4	MS21042L5	NUT (OR MS21042-5)
22	8	8	8	8	8	8	NAS1149C0563J	WASHER (OR AN960JD516)
23						*2	D3190-1	CHAFING SHIELD
40	*2		*2	*2	*2	*2	D2873-043	NUT PLATE
41	*2		*2	*2	*2	*2	D2873-045	NUT PLATE
42		2					D2872-043	NUT PLATE
43		2					D2872-045	NUT PLATE
44	10		10				AN5-7A	BOLT
45		10		10	10	10	AN5-10A	BOLT
46	4	10	4		4		AN5-30A	BOLT
47				4		4	AN5-32A	BOLT
48			12				AN970-4	WASHER (OPTIONAL)
49		6					MS21042L5	NUT (OR MS21042-5)
50	10	12	10	10	10	10	NAS1149C0563J	WASHER (OR AN960JD516)
60		1					D3039-3	CENTER DRILL (TOOLING, NOT INSTALLED)

*REFERENCE ONLY. PARTS ARE INCLUDED IN D206-667-141/-143/-241/-243 & D407-667-145/-245 ASSEMBLIES ABOVE

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RAPPORT D'INSPECTION PAR RESSUAGE

P- 12619

ACUREN

PAGE 1 DE 1

CLIENT DART AEROSPACE
ATTENTION LINDA
ADRESSE 1270 ABERDEEN ST. HAWKESBURY, ONT. K6A 1K7
PROJET
ITEM(S) EXAMINÉ 4 X-TUBES

DATE 2011-09-06 HEURE ☒ AM ☐ PM
N° TRAVAIL ACUREN 188-11-02352
N° CLIENT PO/WO ~~305 51~~ 14837
SITE DE TRAVAIL SHOP
ACCEPTATION STD. ASTM E1417-05 DATE/RÉV. 05 (NO CRACKS)

DESCRIPTION DES TRAVAUX

N° PROCÉDURE LT~~0002F~~ DATE/RÉV. 2005 N° TECHNIQUE LT-x4xx-xxx DATE/RÉV. 2005

N° ITEMS MATÉRIEL ÉPAISSEUR VARIABLE
DESCRIPTION INSPECTION ON 100% OF SURFACE (EXT.) OF 4 CROSSTUBES BY F.P.I.

DÉTAILS DES INSPECTIONS

MÉTHODE : ☒ FLUORESCENT ☐ VISIBLE
MARQUE : MAGNAFLUX
PÉNÉTRANT : ZL-27A — TEMPS PÉNÉTRATION MIN. 10 MIN.
DISSOLVANT PÉNÉTRANT SKC-S — TEMPS SÉCHAGE MIN. >10 MIN.
RÉVÉLATEUR — TEMPS RÉVÉLATION MIN. 10 MIN.
TYPE RÉVÉLATEUR ☒ NON AQUEUX ☐ AQUEUX ☐ SEC

☐ LAVABLE À L'EAU ☐ MÉTHODE DISSOLVANT ☐ PRÉ-ÉMULSIONNANT
LUM. NOIRE S/N 15M004933 PUISS. > 1 000 µ W/CM² ☒ AMBIANT < 2 fc
ÉQUIP. LUMIÈRE ☐ LAMP.POCHE ☐ LAMP.CULASSE ☐ PUISS.>100 fc @ SURFACE
AUTRES
MÈTRE LUM. N/S DATE CAL DUE

SURFACE INSPECTÉE

CONDITION SURFACE ☐ MEULÉE ☐ SOUDÉE ☐ MACHINÉE ☐ MRENAILLÉE ☒ MÉTAL PROPRE
TEMPÉRATURE SURFACE ☐ < - 4°C/20°F ☐ – 4°C/20°F À 10° C/50°F ☒ 10°C/50°F À 52°C/125°F ☐ > 52°C/125°F

RÉSULTATS

(☐ MÉTRIQUE ☐ IMPÉRIALE)

ITEM	COMMENTAIRES	ACCEPTÉ	REJETÉ
1	W.O. 72262 ITEM: D407-667-205	✓	
1	W.O. 72261 ITEM: D407-667-205	✓	
1	W.O. 69958 ITEM: D407-667-205	✓	
1	W.O. 72973 ITEM: D407-667-105	✓	

11-09-07

Étendue des Services
L'entente selon laquelle le Groupe Acuren Inc. Exécute les services ne concerne que les énoncés par écrit. En aucune circonstance ces services ne s'étendent au-delà de l'exécution des services demandés. Il est entendu que toutes les descriptions, les observations et les expressions d'opinions faites par Acuren reflètent les opinions ou les observations de l'entreprise fondées sur l'information et les hypothèses fournies par le propriétaire/opérateur, et elles ne constituent pas des déclarations ou des garanties ou ne peuvent être interprétées comme constituant. Le Groupe Acuren Inc. N'assume aucune des responsabilités du propriétaire/opérateur, et le propriétaire/opérateur conserve la responsabilité entière des décisions prises en matière d'ingénierie, de fabrication, de réparation et d'usage à partir de l'information ou des données fournies par Acuren en rapport avec les services décrits dans les présentes ne peuvent excéder le coût des services rendus.

Norme de Diligence
Dans l'exécution des services, le Groupe Acuren Inc. Applique le degré de diligence, le soin et la compétence normalement exercés dans des circonstances semblables par d'autres fournisseurs de ce type de services opérant dans la même localité ou dans une localité similaire. Aucune autre garantie, implicite ou explicite, n'est faite ou voulue par le Groupe Acuren Inc.

SIGNATURES

REPRÉSENTANT
TECHNICIEN (SIGNATURE): Matthew Murdock (MOULÉ) — Matthew Murdock (SIGNATURE)
NOM (MOULÉ): DAVID PGE, N (1ER TECHNICIEN) — (2ÈME TECHNICIEN)
ONGC NIVEAU 2 SNT NIVEAU — ONGC NIVEAU — SNT NIVEAU —
ONGC N° REGISTRATION 116 11 — ONGC N° REGISTRATION

FTJ#:
RAPPORT RÉVISÉ PAR: NOM INITIALES

LFD-H3044

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PT Décembre 2005